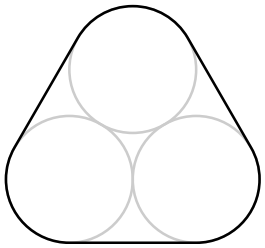
BRITISH COLUMBIA SECONDARY SCHOOL MATHEMATICS CONTEST, 2017

Junior Final, Part B – Draft 7

Friday, May 5

key:17012 1. Three cylindrical pipes of radius 1 m are held together by a tight metal band as shown. The length of the metal band is $a + b\pi$ meters, where a and b are positive integers. Determine a and b.



key:17052 2. Fill the following table so that the following three conditions are met:

- Each row contains all of the numbers 1, 2, 3, 4, 5, 6, 7 in some order.
- The sum of the numbers in each column is 12.
- Each column contains three different numbers.

1	2	3	4	5	6	7
				6		
		5				

key:17096 3. Let x and y be two numbers with a difference of 4 and a product of 1. Determine the value of $\frac{x}{y} + \frac{y}{x}$.

key:17088 4. The x-coordinates of the vertices of a square in the plane are 1, 3, 8 and 10. Determine the area of the square.

key:17095 5. Let N be a 3-digit number with three distinct non-zero digits. We say that N is mediocre if it has the property that when all six 3-digit permutations of N are written down, the average is N. For example, $N = 481$ is mediocre, since the average of $\{481, 148, 184, 418, 814, 841\}$ is 481. Determine the largest three-digit mediocre number.